Original Land

ADDITIONAL MARINE LOG BOOK DATA 1936 to 1948

INTRODUCTION

- 1. The statement of requirement is at annex A.
- 2. This contract is to examine ships metereological records in the archives at Bracknell and Public Records Office Kew, to see whether all data had been transferred to the Marine Data Bank at the Meteorological Office.
- 3. Interest is focused on three specific periods where data is short, 1854 to 1900, 1910 to 1920 and 1936 to 1948. This report covers the latest period 1936 to 1948.
- 4. The archives hold four types of marine recordings:

Warship Meteorological Log Books - there are 812 covering this period in the archives at Bracknell.

Merchant Ship Meteorological Log Books - there are 3,795 covering this period in the archives at Bracknell.

Merchant Ship Met Forms - there are 10,887 covering this period at Bracknell.

Warship Deck Logs - there are 27,661 covering this period at Kew.

MARITIME ACTIVITY 1936 to 1948

5. The logs clearly illustrate maritime activity at that time and reaction to world events.

Warships

- 6. In 1936 the Fleet was supporting British interests in:
 - A. China Sea based in Hong Kong.
 - B. East Indies based in Singapore.
 - C. Indian Ocean based in Trincomalee, Ceylon. D. Mediterranean based in Malta and Gibraltar.
 - E. South Atlantic based in Simonstown, South Africa.
 - F. West Indies and Western Atlantic based in Bermuda.
- 7. The nineteen thirties were enjoyable years in the Navy, gunboat diplomacy and political strategy required sea power to be seen, not out of sight, at sea. From 1936 to 1940 warships spent a large proportion of their time in harbour. Regulations required Naval Officers to work onboard only when duty required. Sporting facilities were extensive and travel devoid of bureaucratic restrictions. Base ports attracted 'the fishing fleet', unattached daughters sent to visit relatives, friends or parental contacts to 'catch' an eligible husband. When ships did venture out for spring or autumn exercises they visited the same standard ports on station. The 'fishing fleet' followed. Meteorological observations pre-war repeatedly cover much the same ground.
- 8. By 1940 the pattern of Naval activity had changed dramatically

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warships were redeployed to protect essential seaborne supply routes and the convoy system was underway in earnest. The next two years give a wealth of meteorological observations. The bulk of observations came from smaller escorts and Armed Merchant Cruisers continually at sea protecting convoys. Capital ships left their defended anchorages, normally only to take transit or engage in set battle pieces.

9. Towards the end of the war and post war years warship activity returned in strength to the Indian and Pacific Oceans.

Merchant Ships

- 10. Trade pre-war extended world wide with regular traffic eastwards to the Middle East, Far East and Australasia. Westwards and southwards trade flourished with South Africa, South America, Canada and The United States east and west coasts. Whaling ships brought observations from southern latitudes.
- 11. Observations ceased from all merchant ships during the war years but resumed afterwards and by the end of 1946 were back to previous levels of reporting in former trade routes.

METEOROLOGICAL LOG BOOKS

Warship

- 12. Large warships or the senior ship of a squadron carried qualified Meteorological Officers from the Instructor Branch of the Royal Navy. Observations were from precision instruments carried by these ships.
- 13. Annex C shows an example from a typical log. Met Officers did not normally take observations during the hours of darkness and therefore most logs record observations only three times a day usually 0800, 1200 and 1800. However some logs do contain this reduce the considerably more observations than this normal standard, as
- 14. It is clear that sometimes other duties conflicted with meteorological observations and in one Log the Met Officer records his frustration with conflicting demands between being Flight Deck Officer controlling movement of aircraft and taking his readings.
- 15. Quantity varies greatly. VALIANT's log volume 8 is an example of a log with a large amount of excellent information; photographs of clouds, copies of weather forecasts, barograph papers, accounts of windfinding by shell, records of upper air temperature and diagrams of weather maps as well as standard observations.
- 16. There are some interesting accounts of how the weather affected actions with the enemy (an example is at annex G). Occasionally something of more general met interest is recorded. BERWICK Mar 39 Log includes a cutting from the Times recounting the loss of Empire Flying boat The Cavalier, with three lives, due to icing in the carburettors.

- 17. Annex H shows a page from SUFFOLK's log S9 with an account of a lunar rainbow.
- 18. 1,042 Warship Met Log Books from the archives at Bracknell were examined, 812 covered the period of interest. The Data Bank lists HM ships under series number 204 and log book number 32768. In the archives each ship has its own archive code i.e. AJAX -'AX1' 'AX2' etc.
- 19. Examination of each log book showed not all observations had been keyed. The policy appears to have been to take only 3 or 4 for each day whatever number was available. It is estimate that some 15,000 extra observations could be found if all available observations were now required. Annex B shows where these log books are stored in the archives.
- 20. Only 8 logs had not been keyed at all. Three because of lack of geographical positions but it was not evident why the others had not been keyed.
- 21. The number of observations keyed are pencilled in the back cover of each log. Researches showed:
 - 101,872 observations noted as keyed 95,499 observations listed by the computer as keyed
 - 6,373 unaccounted

Merchant Ships

- 22. A proportion of merchant ships join the VOF (Volunteer Observer Fleet) either by invitation from the Met Office or by the shipping company volunteering its services. Vessels are supplied with precision instruments from the Met Office and a Meteorological Log Book. Records from these observations are recorded in the Data Bank under the heading of 'selected ships'.
- 23. Annex D shows an example of a Merchant Ship Meteorological Log. Annex B shows where they are stored in the archives. 3,795 log books were examined. The Data Bank lists these under series 203, 205 and 207. All observations had been keyed, under log numbers 19020 to 19279 for the period 1936 to 1939, and 1 to 3536 for 1945 to 1948.

METEOROLOGICAL FORMS

- 24. Non selected merchant ships or Auxilliary Reporting Ships as they are known by the Met Office Marine Branch, record observations on 'Met Forms', a single sheet of paper allowing four sets of observations each day. An example is at annex E. These ships use their own instruments supplied from company sources.
- 25. 10,887 Met Forms covered the period with archive log numbers from 33757 to 44644. Only the Met Forms after the war years, numbers 43001 to 44644 had been keyed. Numbers 33757 to 43001 contain data for the period of interest and have not been keyed. This gives some 520,000 observations available to add to the Data

Bank. Annex B shows where they are stored in the archives.

26. In addition, a bunch of loose Met Forms were discovered, forwarded by Australian and New Zealand Merchant Ships sailing the Pacific and Indian Oceans between 1945 and 1948. Met Forms had been keyed but W/T transmission forms from other ships but not accompanied by a Met Form, had not. This latter source could yield some 3,000 additional observations mostly from the southern hemisphere to add to the Data Bank.

DECK LOGS

- 27. Warship deck logs are forwarded to the Public Records Office at Kew when they are completed. Merchant ship deck logs reside in shipping company offices and are not kept by all companies.
- 28. Weather observations are recorded at the end of each watch at sea: 0400, 0800, 1200, 1600, 1800, 2000, 2359. The geographical position of the ship is recorded three times daily: 0800, 1200, 1600. An example is given at annex F.
- 29. 27,661 Deck Logs covered the period of interest, archive numbers 100697 to 128358, all were examined. None of the observations had been keyed into the maritime data bank.
- 31. Some 290,000 observations with geographical positions are available from Deck Logs to add to the data bank. If the ship's position were interpolated between 1600 and 0800 to give all 'end of watch' observations a geographical position, a total of some 600,000 new observations could be keyed into the data bank.
- 32. This calculation $\underline{\text{does not}}$ include observations from Deck Logs where a Meteorological Log Book was kept and the data has been keyed.

MARITIME DATA BANK

33. Checks of all types of logs with data already recorded in the data bank showed an average of 8% keying errors in transferring data. The most frequent error being in changing local time to Greenwich Mean Time. All logs at sea are kept in local time. Most errors were small but errors crossing midnight could lead to a 24 hour error if the time was changed but not the date.

SUMMARY OF OBSERVATIONS AVAILABLE

34. The following observations could be added to the Data Bank:

Warship Met 6,373 noted in the back of the log book as keyed Log Books but not found in data bank.

(Bracknell) 15,000 not keyed as sufficient data was keyed at the time.

Warship Deck 290,000 not keyed at all. 600,000 if ship's position (Kew)

Merchant Ship

Met Forms 520,000 not keyed at all.

(Bracknell) 3,000 Australian & New Zealand

Total

834,373 or 1,144,373 if ship's position is interpolated.

Additional Data expressed by global area:

Log	Atla North	ntic South	Med	Indian North	Ocean South	Paci North	fic South
Warship Met Logs	45%	5%	22%	12%	8%	5 %	3 %
Warship Deck Logs	43%	6 ક	16%	17%	9%	6%	3%
Merchant Ship Met Forms	30%	25%	15%	11%	10%	6%	4%

OUALITY

- 35. Met Log Books were completed by specialists in the field of meteorology. Observations were of good quality taken from precision instruments. Notes on instrumentation are in the front covers. Annex C2 shows notes from a warship. Annex C3 is a particularly interesting report from a Met reporting officer typical of reports sometimes included in logs early in the period.
- 36. Their logs were assessed in the Royal Navy's case by the Director Naval Meteorology and given a grading, annex C4 is an example of the certificate attached to the log before forwarding to the Met Office. The Met Office's own Marine Branch assessed Merchant Ship Met Log Books with a certificate attached to the log as seen in annex D1. A VOF officer achieving 18 years high standard of reporting received a presentation baragraph. This custom continues today.
- 37. Observations in Deck Logs and Met Forms have been made by professional Mariners but with ships instrumentation. Nevertheless, the quality is considered satisfactory by the Met Office Marine Branch. Instruments are frequently checked by Port Metereological Officers world wide in an internationally linked VOF organisation.
- 38. Deck Logs were kept in 'rough' throughout this period and neatly copied in ink in the fair log the following day by the Navigating Officer or his assistant. A small number of copying errors may therefore have been made. Wind speed and direction would be estimated by looking at the height and direction of the waves. An experienced eye would give +/-10 degrees and +/-5 knots accuracy. Barometric, wet and dry readings would be from portable instruments, sea temperatures from engine room intakes.
- 39. Both the Merchant Service and the Royal Navy had allowances paid above and below specific temperatures. The Royal Navy gave

free issues of 'limers', a popular thirst quenching scurvy deterrent drink, in tropical climates. However, whilst there may have been incentives to adjust readings, 'Pussers' of the Royal Navy and 'Pursers' of the Merchant Marine, who accounted for these perks guarded the public or company purse with greater fortitude than their own. The legal status of deck logs and accuracy were respected.

40. Quality standards are assessed as:

Meteorological Log Books - completed by warship and merchant ships using precision, well calibrated instruments accurately read and recorded.

Deck Logs and Met Forms - completed by ships using their less precise instruments satisfactorily calibrated accurately read and recorded.

KEYING COSTS

41. Costs would depend on the ease and speed of extracting the data. An assessment is as follows:

Met Forms - Single sheets that could be temporarily removed in their boxes from the archives at Bracknell, to be processed at a site convenient to the contractor. This should reduce the time and cost factors.

Warship Deck - Cannot leave the archives in Kew. Limited space and access for the contractor increasing time and cost.

Warship Met Could be temporarily removed from the archives at Bracknell to reduce cost and time.

RECOMMENDATION

- 42. It is recommended that:
- A. Met Log observations 6.373 are disregarded as too time consuming and costly to resolve.
- $\ensuremath{\mathsf{B}}.$ The following observations be keyed into the data bank in the priority order:
 - Merchant Ship 520,000 Met Forms 3,000

Warship Deck

Log 600,000 with interpolated positions

Warship Met

Log 15,000

Total 1,138,000

I agree since a) is cheapest and c) are only day time

43. It is possible to increase the 585,599 observations in the Data Bank threefold, if the recommendations are implimented.

OTHER SOURCES WORTH INVESTIGATING

- 44. Marine observations are also held by the following:
- A. Hygrographic Office Taunton HM Survey ship Deck Logs.
- B. Defence Research Agency sea temperature gradients.
- C. Hydrographic Office Taunton Surface ship, submarine and maritime aircraft bathythermograph records.
- D. Engine Room Registers kept at MOD(Navy) Bath.
- E. Merchant Ship Deck Logs held by shipping companies.

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Martin H Rhodes Management Information Services 10 March 1994

Annexes: A. Contract Requirements.

- B. Plan of Bracknell Archives.
- C. Sample of a Warship Met Log Book page.
- C1 Sample of a second style of Warship Met Log.
- C2 Notes on warship instrumentation.
- C3 Warship Met Officer's report.
- C4 Director of Naval Met certificate of inspection.
- D. Sample of a Merchant Ship Met Log Book page.
- D1 Met Marine Branch certificate of inspection.
- E. Sample of a Merchant Ship Met Form.
- El Reverse side of Merchant Ship Met Form
- F. Sample of a Warship Deck Log page.
- G. Weather and enemy action.
- H. Lunar rainbow.
- I. Genuine 1937 'Fag end'(original report only).

Specification of requirements for identifying sources of additional Marine Logbook Data.

1. Background

It has been shown from listings of ship numbers and call signs in the Marine Data Bank that certain Logbooks in the Meteorological Office Archives have not been keyed.

Some of the Logbooks, not keyed, have a unique character presentation to describe the wind direction. These records cannot be found in the digitised data bank and it seems probable that many years ago a decision was taken not to key these data.

The Met. Office holds about 600,000 Meteorological Logbooks from Royal Navy and Merchant ships. A preliminary search of the Public Records Office at Kew identified 160,000 Navy Logbooks (Captains Logbooks). Most Naval ships have two Logbooks - Captains Log and the Met. Log. It is necessary to know if the meteorological records at Kew are duplicates of the records in the Met. Office. The largest proportion of these Logbooks record data from 1950 onwards, but there are significant numbers back to 1854.

Preliminary comparisons of observations made at the same time in the Captains Logbook and Meteorological Logbook occasionally show significant differences in instrumental readings.

The Met. Office Logbooks are catalogued in ship and time order and there is a comprehensive index which describes Ship names, routes and times for all ships logbooks. The indexing of the records in the Record Office at Kew is no as comprehensive for early years, but after 1939 the logbooks are grouped by year and ship.

The years before 1900 and the War years - 1911 to 1920 and 1936 to 1948 are noticeably short of data in the Marine Data Bank and it is possible that observations from these times are only available from the Navy Logbooks archived at Kew.

There is a great deal of international interest in finding additional sources of marine meteorological data. In particular the USA's National Climate Data Center (NOAA) is very keen to obtain as many data as possible to enhance the Comprehensive Ocean Atmosphere Data Set - COADS. The Met. Office as part of WMO has a commitment to assist in the search for additional data.

A contractor will be employed to key the observations from the Logbooks, if significant numbers of additional data are found.

2. Requirements

The Archives at the Met. Office and at Kew are to be searched for meteorological observations which have not been copied to the Marine Data Bank. Logbooks are to be categorised so that a proper assessment can be made as to whether any additional data discovered should be keyed and added to the Data Bank.

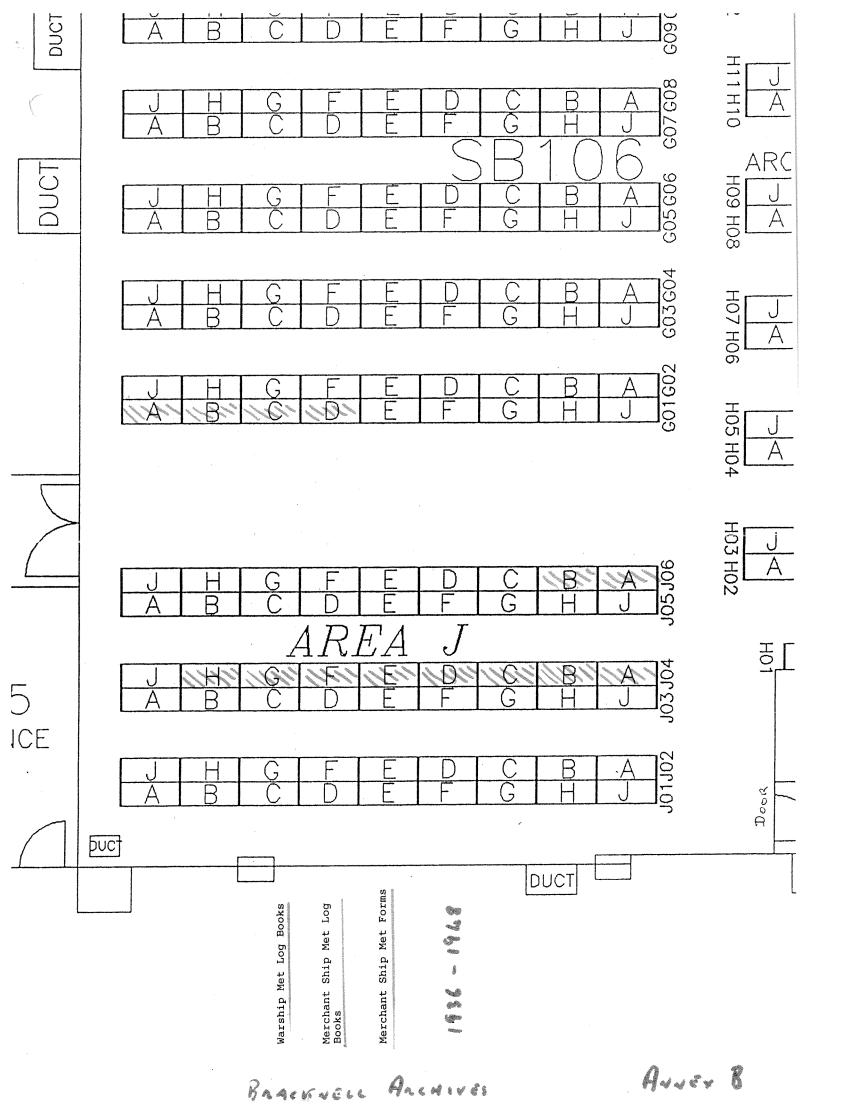
The following routine will be used to categorise the Logbooks.

In the Met. Office Archive.

- 2.1.1 A list of the Logbook numbers contained in the Marine Data Bank will be made available. The shelves should be searched, and Logbook numbers not on the list of keyed books should be noted as "Not Keyed".
- 2.1.2 The number of observations keyed from each Logbook in the Marine Data Bank will also be made available and this should be compared with the number of observations in the Logbook in the Archive. If only part of a Logbook has been keyed, the Logbook should noted as "Part Keyed". Otherwise the Logbook will be noted as "Keyed"
- 2.1.3 "Not Keyed" and "Part Keyed" Logbooks will be further classified to indicate whether additional data are worth keying. This is a learning exercise and the decision will be made initially by Mr Jackson and the scrutineer, after examination of the logbooks.
- 2.1.4 Logbooks which contain the wind direction as a diagram should be identified as containing "Wind Characters".
- 2.1.5 If there are any further classification problems, they should be discussed with Messrs Jackson and/or Parker.
- 2.1.6 The number of observations and the numbers of logbooks containing observations to be keyed are to be grouped into years and Ocean areas North Pacific, South Pacific, North Atlantic, Indian Ocean.

At the Public Records Office, Kew.

- 2.2.1 The observations should be compared with observations in the Marine Data Bank. Listings of observations from the Data Bank will be available for comparison.
- 2.2.2 Methods of making the observations should be noted.
- 2.2.3 Significant differences between observations made at the same time should be noted.
- 2.2.4 The ships position is given only three times in the day in the Captains Logbook. It will be necessary to find a method of obtaining the position when an observation is made.
- 2.2.5 The number of observations and the numbers of logbooks containing observations to be keyed are to be grouped into years and Ocean areas North Pacific, South Pacific, North Atlantic, Indian Ocean.



METEOROLOGICAL INSTRUMENTS ON BOARD.

BAROMETER.		
Maker's Name and M.O. No Caldurana 2364/36 Height of Cistern above Sea Level 15		
Height of Cistern above Sea Level	***************************************	
Standard Temperature 285:4 A at 1000 mb	***************************************	
Position Captains Lobby - upper dece	<u> </u>	
BAROGRAPH (Open Scale).		
Maker's Name and M.O. No. Short and Maker 87/34		
Position Plotting Room - Lown Bridge		
	Date	
THERMOMETERS FOR AIR TEMPERATURE.	- Inches	
Dry-Maker's Name and M.O. No. Caldnana 34861/35	1	
Wet Melen No. 120 or Cold	••••••	
Wet-Maker's Name and M.O. No. Caldinaia 34067/33		
" " " " " " " " " " " " " " " " " " "		
Height above Sea Level of Deck from which Observations are made !5.	It. on Q.D. in harbor It. on Lown Bridge at &	u. u.
TOTAL CONTENT OF THE PARTY OF T	•	1 04.
Maker's Name and M.O. No. Casulla 72/34		
Height above Sea Level of Deck from which Observations are made		
THERMOMETER FOR SEA TEMPERATURE.	Date from to	
Maker's Name and M.O. No.	11.0111	
39 39 39 39		
THERMOGRAPH (Distant Reading).		
Whether Dry and Wet Bulbs or Dry Bulb only Wet and day	de lla	
Maker's Name and M.O. No. Neguti and 2 ambra 2	7/2:-	
Position of Bulbs on Jue side of Craws Nest in la	(122	
Height above Sea Level 92		
Height above Recording Instrument		
Length of Capillary Tubing (Single Length) approx. 75		
Distance of Bulbs from Funnel. 331/4.		
WIND DIRECTION AND SPEED RECORDERS.		
Direction Recorder—Maker's Name and No		
Speed Recorder—Maker's Name and No. Muno 523		
Position of Vane on fru top mast 4 st. above	Crows Next	
Height above Sea Level 96		
Height above Sea Level 96 Diameter of Pressure and Suction Tubing ½	***************************************	
METEOROLOGICAL OFFICE.	***************************************	
Position Plotting Rom on Lown Bridge		
Size 14.14. x 6.14	, 	
REMARKS.		
Entrus marked with a red cros x are read	and made do	
the Mat. Officer himself. The remainder an	rober 1 b	
Deck Log, and man not to vous	I franchis	*

aradings from the latter are entered to the nearest mb.

Entires in and are construction, one night shows jugge,

THE BEAUFORT WIND SCALE.

Beaufort Number Inter- national,	Speed of wind in Knots at a height of 33 feet.
0	Less than 1
1	13
2	46
3	7—10
4	1116
5	1721
6	22—27
7	2833
8	3440
9	41—47
10	4855
11	5665
12	Above 65

In a steamer the force of the wind may be judged by an experienced observer by the appearance of the sea, remembering that rain has a smoothing effect, and tidal streams or currents influence the sea surface differently when there is a weather or lee tidal stream or current.

DOUGLAS SEA AND SWELL SCALE.

					SWE	CLL.				
		Lo	w.	Мо	dera	te.	Н	[eavy		
SEA.	o No Swell.	Short or Average.	o Long.	co Short.	Average.	or Long.	9 Short.	- Average.	∞ Long.	confused.
	 				*			'		
0 Calm	 00	01	02	03	04	05	06	07	08	09
1 Smooth	 10	11	12	13	14	15	16	17	18	19
2 Slight	 20	21	22	23	24	25	26	27	28	29
3 Moderate	 30	31	32	33	34	35	36	37	38	39
4 Rough	 40	41	42	43	44	45	46	47	48	49
5 Very Rough	 50	51	52	53	54	55	56	57	58	59
*6 High	 60	61	62	63	64	65	66	67	68	69
*7 Very High	 70	71	72	73	74	75	76	77	78	79
*8 Precipitous	 80	81	82	83	84	85	86	87	88	89
†9 Confused	 90	91	92	93	94	95	96	97	98	99

Note.—In this scale a new departure has been introduced in that length of swell and height of swell are, from the point of view of observations, considered separately and then combined together for coding.

A Short Swell means a Swell where the length or distance between each successive top of swell is small.

A Long Swell means a Swell where the length or distance is large.

A Low Swell means a Swell where the height between the lowest and highest part of the swell is small.

A Heavy Swell means a Swell where the height is great.

*These are considered to represent seas which occur with a swell or in the open ocean, for instance, the highest sea recorded in sheltered waters would be 5, or under exceptional circumstances (e.g., a hurricane) 6 or 7 might be used. The idea of the roughness would be conveyed by the force of the wind.

 $\dagger \text{Occasioned}$ by current, tidal stream, sudden shift of wind, and not necessarily strong wind.

The above scales for sea and swell have been adopted separately for international use in weather reports.

TABLE FOR FINDING RELATIVE HUMIDITY.

Dry	Depression of Wet Bulb.												
Bulb. °F.	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°
90	100	96	92	88	84	81	77	74	70	67	63	60	57
88	100	96	92	88	84	80	77	73	69	66	63	59	56
86	100	96	92	88	84	80	76	72	69	65	62	58	55
84	100	96	92	87	83	79	76	72	68	64	61	57	54
82	100	96	91	87	83	79	75	71	67	64	60	57	53
80	100	96	91	87	83	79	74	70	66	63	59	55	52
78	100	95	91	86	82	78	74	70	66	62	58	54	50
76	100	95	91	86	82	78	73	69	65	61	57	53	49
74	100	95	90	86	81	77	72	68	64	60	56	52	48
72	100	95	90	85	80	76	71	67	63	58	54	50	46
70	100	95	90	85	80	75	71	66	62	57	53	49	44
68	100	95	90	84	79	75	70	65	60	56	51	47	43
66	100	95	89	84	79	74	69	64	59	54	50	45	41
64	100	94	89	83	78	73	68	63	58	53	48	43	39
62	100	94	88	83	77	72	67	61	56	51	46	41	37
60	100	94	88	82	77	71	65	60	55	50	44	39	34
58	100	94	88	82	76	70	64	59	53	48	42	37	31
56	100	94	87	81	75	69	63	57	51	46	40	35	29
54	100	93	87	80	74	68	61	55	49	43	38	32	26
52	100	93	86	79	73	66	60	54	47	41	35	29	23
50	100	93	86	79	72	65	59	52	45	38	32	26	20
48	100 100	92 92	85	77	70	63	56	49	42	36	29	22	16
46			84	77	69	62	54	47	40	33	26	19	-
44	100	92	84	75	68	60	52	45	37	29	22	16	-
42	100	91	83	74	66	58	50	42	34	26	18		-
40	100	91	82	73	65	56	47	39	30	27	_		-
38	100	91	81	72	63	54	44	39	31	22		-	
36	100	90	80	70	60	54	44	35	26	18			
34	100	90	79	70	60	50	41	31	21				-
32	100	89	79	. 68	57	47	36	- 27	17				_
30	100	88	76	65	53	43	33	99		1			

LETTERS TO INDICATE THE STATE OF THE WEATHER.

ь	Blue sky (less than 30ths	p	Passing showers.
	covered).	q	Squalls.
bc	Sky partly cloudy ($\frac{3}{10}$ ths to $\frac{7}{10}$ ths covered).	r	Rain.
c	Generally cloudy (more than $\frac{7}{10}$ ths covered).	<i>r</i> 8	Sleet, i.e., rain and snow together.
d	Drizzle, or fine rain.	8	Snow.
e	Wet air without rain falling.	t	Thunder.
f	Fog.	u	Ugly, threatening sky.
fe	Wet fog.	v	Exceptional visibility (ab- normal clearness of the
g	Gloomy.		atmosphere).
h	Hail.	w	Dew.
i	Intermittent.	x	Hoar frost.
KQ	Line Squall.	y	Dry air.
ı	Lightning.	z	Dust haze.
m	Mist.		

o Overcast sky (10ths covered

REPORT ON METEOROLOGICAL WORK - H.M.S. "AJAX".

Meteorological Organisation in "Ajax".

No Meteorological Office has yet been constructed but the Meteorological Officer has been given the use of the Plotting Room when not required as such, and he is usually able to work there undisturbed.

No Pilot Balloon Shelter has been provided. The hydrogen cylinder in use is kept underneath the Catapult Platform, and the balloon is filled abaft this platform. In light winds this can be done reasonably accurately, very little final adjustment being required in a sheltered position, but with strong or beam winds, it is found that a considerable amount of hydrogen is wasted, due to being unable to estimate when the helloon is is wasted, due to being unable to estimate when the balloon is correctly filled.

The Meteorological Officer has been given the part-time assistance of an Able Seaman from part of Ship, who has been taught to plot the synoptic charts and to look after the care and maintenance of the various instruments.

Supply and Erection of Instruments.

 $\mbox{H.M.S.}$ "Ajax" was constructed at Barrow-in-Furness, and on being taken over by the Admiralty had been supplied with the following instruments:-

- Mercurial Barometer in the Admiral's Lobby.
- Distant-reading Thermograph on the fore side of the Crows Nest with the recorder in the Chart House (by Admiralty specification).
- Barograph in the Chart House.

After commissioning at Portsmouth, the remainder of the Meteorological instruments (pilot balloon outfit, Assmann Psychrometer, strut psychrometer, aeroplane aneroid etc.) were

The open scale barograph and Munro Wind Speed Recorder, graduated to 80 knots, were not supplied until very shortly before leaving for the Mediterranean, and no time was available for their erection then.

On arrival at Malta it was arranged that the Dockyard should erect the Wind Speed Recorder. A consultation took place between the Dockyard, a representative from the Malta Meteorological Office and the Ship's Meteorological Officer as to the most suitable place for this. The Anemometer Head was erected on a bracket on the fore side of the fore top - mast with the Recorder in the Plotting Room. The disadvantage of this position is that if it is required that the top-mast be struck, it will also be necessary to first remove the wind vane, etc. This is not very satisfactory in view of the fact that the top-mast is so designed as to be enabled to be struck rapidly. The Dockyard representatives though, were of the opinion that The Dockyard representatives though, were of the opinion that this would have to be accepted, due to lack of alternative positions. They were not prepared to extend the bracket on which was mounted the Gunnery Wind Recorder, or mount it on top of the Crows Nest, which positions were preferred by the Ship's Meteorological Officer.

/Opportunity

Opportunity was also taken whilst at Malta of mounting the open scale barograph on the athwart ship bulkhead of the Plotting Room.

Assistance was given by the Malta Meteorological Office in setting up the recorder and seeing that it was functioning correctly when the work was completed.

REMARKS ON INSTRUMENTS.

Munro Wind Speed Recorder.

This instrument was mounted on the athwart-ship bulkhead of the Plotting Room, being the only position suitable without reorganising the lay-out of the other instruments already there. No trouble has been experienced in the siphon pen losing suction due to movement of the ink in the trough (vide Periodical Letter 9/35, received since). It has been found, however, that the ink in the trough is inclined to overflow in even quite moderate rolls, of say 10, and run all over the chart.

 $$\operatorname{\textsc{The}}$ D.R. Thermograph and O.S. Barograph have been mounted athwartships.

Distant-Reading Thermograph.

On many occasions it has been found that the muslin and wick on the wet bulb have become dry long before anticipated. In the 'Notes' issued with the instrument, it states that 'the muslin should be changed once a week, or more frequently if there is reason to believe salt spray has blown over it'. This routine was carried out at first, but it has been found in practice that the muslin sometimes becomes dry in two days and sometimes it lasts as long as a becomes dry in two days and sometimes it lasts as long as a week. A decrease or an increase in relative humidity appears to have little effect. At present, the routine is to change the muslin every two days.

Electric Psychrometer.

This instrument has not been used to any great extent, due to the time taken in setting the instrument up and obtaining the necessary readings.

Daily Routine, Forecasting, etc.

Whilst at Malta, the Meteorological Officer was disembarked at Calafrana, and no organised meteorological routine was carried out until the ship sailed for the West Indies.

On arrival on the America and West Indies Station, the two Arlington Reports were plotted daily, other circumstances permitting. Very little information was available for the area in which the ship then was. Consequently, forecasts issued were not very reliable, and were only of a general character.

The ship returned to the Mediterranean at the beginning of September. Owing to our other W/T commitments, Rinella synoptic reports only have generally been read. While stationed in the Eastern Mediterranean, forecasts have not been issued unless more information has been available or when reliability could be placed on them.

/Owing

Owing to his other work in the ship, the Meteorological Officer has not been able to insert the necessary information regularly in the Meteorological Log, or at regular times. On most days though, the Meteorological Officer has logged two observations himself (marked with a red cross), the remainder being copied from the Deck Log.

No weather of extraordinary interest has been experienced. The synoptic charts of August 20th - 23rd and September 1st - 7th show the path followed by two tropical disturbances in the West Indies and North American Waters, the latter doing considerable damage in the vicinity of Key West. The wind speed autographic record from September 18th - 20th shows clearly the gustiness experienced by a ship at the Detached Mole at Gibraltar during a Levanter.

During long sea passages a pilot balloon was sent up daily as a routine.

No attempt was made to put in the fronts on the chart owing to their being such a long distance away from the ship.

Method used for Pilot Balloon Observations.

The two Searchlight Sights on the Fore Bridge, stabilised for azimuth and elevation, and fitted with Barr and Stroud binoculars are used for following the pilot balloons. The Sight on the weather side is trained on approximately the reciprocal bearing of the balloon, and is layed on the horizon. At the moment of each observation, the angle of depression or elevation due to ship's roll is read off, and subtracted or added to the elevation observed. This method has been used in guite moderate rolls, and good results have been obtained no quite moderate rolls, and good results have been obtained, no smoothing out of the curve being required in the majority of the

If the balloon crosses the ship, it is necessary of course to cross over from one sight to the other. The delay caused has to be accepted, but not more than one observation should be missed.

A personnel of three only is required for this method one at each sight and a Timekeeper, who acts as recorder and also reads off the observed Elevation and Bearing.

Abstract of Ship's Meteorological Log in Naval Division

Meteorological office

American & West Indies (S. American Division) Station

Class of Log .

H.M.S. "AJAX" 6

Meteorological officer Lt. (0) R.T. Shaw, R.N.

Period covered by Log 7.11.36 - 3.2.37.

Ports visited Valparaiso, Juan Fernandez, Puerto Corral

Puerto Montt, Pt. Yates, Alert Harbour, Wide Bay, Port

Famine, Magallanes, Port Stanley, Falkland Isles,

Grytviken (S. Georgia), Buenos aires.

		` \
Date	Position	Weather of special interest
12.11.36	Valparaiso	Thick fog.
29.12.36.	51.0°S., 61.1°W.	4° fall in sea temperature and decreased visibility.
8.1.37 - 11.1.37	Falkland Is. to S. Georgia	Ship steaming in a depression.
11.1.37.	53.7°S., 37.6°W.	Fog, icebergs.
17.1.37.	54.1°S., 45.2°W.	Thick fog 0630 - 0745.
-	,	

Pilot Balloon Ascents

Upper Air Temperatures

Records of O.S.Barograph. D.R.Thermograph. Wind Speed Recorder.

Symptic Charts Remarks on Synoptic MESSAGES

Forecasts - Single Observes Ship Reports
Photographs
D 31326-1 - 100 C F

AJAX.

H. 243 (late s. 329). (Established November, 1928.) (Revised March, 1934.)

H.M.S.

American and West Indies. South American Division.

METEOROLOGICAL LOG

for H.M. Ships.

Period 7 November 1936, to 32 Filtrary 1937.

DATE.

Officer Almannis Meteorological Officers

Commanding Officer_

Meteorological Log kept on board Rhessena Course and Distance. Wind at the time of ob-True Atmospheric Pressure at Sea Level Thermometers. Current when etermined at shor intervals. Year 193 Each four hour Height of Cistern above Sea ft. The D.R. position is desired every watch in addition to those at noon. When short interval currents are logged, the observed and D.R. positions from and to, with times, should also be given. Day. Ivil Time, TRUE. 10:125 242 4 Earl 5 1026 2 296 1024 4 44 41 169-48 62 120 800t 5 10269 2971 10249 171.00 30 - 10 5 1026.0 298 1028.8 Current in last ho mls. 30-05 173-16 1025.0 298 1022.6 1-06. 4-23 30-03 174-12. 144.22 1025.2 296/2 1023.1 0/0 145.34 ESE 102H8 294 10224 45 42 29.51 5 1022 0 294 1019 9 45 141-74 ES'E 29 · HP <u>144-86</u> 5 1023 9 2981 10216 Er Krr EB - PS 148.58 60 ESE 10228 301 1020.1 Current in last hou mls. Cot 1.29.14 OCIT 179:56 ESE 6 1021.1 300 1018.4 77 28 57 29-6 148-49 60 ESE 612 1021.1 299 1018.6 28:50 144-41 62 ESE 5 1020 a 299 1017-6 30° 4 28.35 88.11 255 62 **ミスヨ** 1014.5 294 1015.0 8 28.18 175.25 255 62 ESE 1018.0 300 1015.B 30000 NOON 28.06 174-18 255 61 S'E 1017.0 301 1014.2 24.50 113.13 60 SE 1014.4 300% 1010.6 80 142.08 1014.4 5018 1015. H 59 SE 24-19 S'S'E 1012.0 298 1009.5 48 31ª 4 097 169:55 South 1008.4 500 1009.1 168.49 PI MXZ 1010-P 299/ 1007-9 781/ 11/6 Runent By 21-33 26.28 168.12 1010.9 302 1004.9 81 Current in last ... hour 26.12 164-08 1010.0 300 1004.2 81 Face - 373

25-54

166.02

184-5

• Please give Readings of the Ship's Barometer, say at Noon, at various times during the voyage noting whether it is mercurial or aneroid

11

1018-8

12

60

NW

10

PS 10-72

See last page of log

34 1012.3 300 1009.5 80 44

1009.9

300

Captain R. & Neville from les Angeles to Manila.

	at time	Clouds of observation	1.	Weathe at time observation	of			Sea Surf	ace.			•	Remarks.		-
Hour. Ship's Time.	clouds are	on from which moving show en determina	ıld be	According		Wave	cale.	Sw		Temp by	Spec. Grav.	of Remark.	Here give Remarks as to phenomena, which cannot be indicated in the other columns, with the times of their occurrence; especially the times of Changes in Direction and Force of Wind, as well as the Direction, Veering or Backing.	Rain- fall by Gauge	
	Nas Upper and Middle.	Lower.	Prop. of Sky Clouded 0 to 10.	to Beaufort Notation.	Visibility or Fo	Direction from TRUE.	Amt. 0-9 by Douglas S	Direction from TRUE.	Amt. 0–9 by Douglas Scale.	No.	by No.	ية ا ي ا العقرا	Force and Duration of Squalls. Ice and Derelicts should be reported on Form 912. Also note the hour at which the Ship arrives in or leaves Port	08/5	
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8	Ci - St	NIL	2	₽.	P	800).	Н	ESE	3	12			ocast stay in contin part of watch 100 Stay charing rate		
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	1-1- Cu	Cracry	l	- 00	1	GOOT	Η	FOL	+	44			Fine + clear weather throughout. Shy mounty clear in contien part of watch		-
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	WIL CL	Cu.	3	be	8	EZ E	H	EZE	H	19	1024	දුණු	Fine + clear weather throughout. Lind freshanced to F. 6	_	
4	A-au	Cu	5	be	8	ESE	48	ESE	Lt	79			Stry mounty clear othering carlies part of watch		_
8	MIC	ESE.	3	te	8	ESE	Ц	EZE	4	49		Jæ	Wind morterated to F.5. Shy generally cloudland throughout	<u> </u>	-
AIDT.	15 IL.	CLOGLAN ESE	5	be		ESE		54 F	4.	48.		1020	Eliza retarded 9 mins		1
	1012.	Cu		<u> </u>	10	<u> </u>	4	EO E	' '	10.		500	Hervy massos of Nb passing over from ESE book rotanded 4 mins.		_
4	MIL	Cu-Nb	<u> </u>	be	8	ESE	4	ESE	4	79			No clouds faising over from ESE throughout		-
8	Ci-81:	Cu FS F	8	- Re-	8	ESE	3	EZE	Ц	80		₩æ	Sky variable from 715 10 clauded, Cu prechemin	أمتلد	_
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4		Stoc			-						1024		Shy mainly over east throughout.		_
<u> </u>	NIL	Cu. Nb	. 10	0	18	SE	3	Sout	2.	81		430,	Dull wreather with o'cast sky		
8	NIL	NE	10	or	8	S'E	ц	South	ત્ર .	81			28° Heavy min squall twind increased to Fb. Dull weather, or aid sky o or casimal shows the	لويده	4
MIDT	A-SL-	St.G.	10	op	8	SSE	ls.	Some	9	81		10=0	black returded 9 mins, wind houlded to SSEF.6		_
1	1	<i>N</i> /-	10	<u> </u>		İ				0,	<u> </u>	5 ₂₀	Sanollo marcas ung in elrength aduration in fatter pa Elos retarded 9 mins 27°17'N, 171°15'E 5 77h		
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8	NIL	Cu. Cu.Nb.	5_	te	8	Wx S	3	SW	8	80		P ₃₀ rt _{ozc}	Wind haulad to WXS' F 4 Shy clearing	zen	
NOON	Ci - St - D - St -	Cu.	Ь.	be	8	NW	3	-Why	3	81	1024	d3ō	Wind houled to NW FH. Variable sky during watch		_
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	Ci-St	Cu	2	<u> </u>		MIZ	3	MMM	3	814	2	1000	Stay mounty clandlass throughout block retained I muss 1030 Wind touched to West F. 2.		_
MIDT	NIL	Cu- Nh	-	lx.	-i	West	-	MMM	١	81	-	<u> </u>	Shy clean in final fant of watch 1120 Heavy masses of Cur Cu. 116	epres	d
28	<u> </u>	17	18	19	20	21	22	23	24	25	26	27	28	29	

so that in the event of the Office Barometer being broken the Ship's can be taken into use and its error can be ascertained.

before commencing.

ANT Form 3

T.S. 118

When this Log is sent into the Meteorological Office at the end of a voyage, demand should be made for all requirements for the next voyage.

How was the screen containing the dry and wet bulbs situated?
Screen fortable + moved to weather side prior to absonutions
If screen is portable and moved to weather side before observations are taken, this should be clearly indicated here.
Where was the Meteorological Office barometer located?
On Chart House, Bulk head
Height of Rain Gauge above Sea Level?feet
In the space marked—Names of Observing Officers—the name of all those who have assisted in keeping the Log should be noted
FOR OUTWARD PASSAGE. Was the Ship's speed measured by Log or Revolutions
State of Loading Light or Deen? See first base of each passage
State of Loading, Light or Deep? See fine! page of each formand was the Propeller immersed?
FOR HOMEWARD PASSAGE.
Was the Ship's speed measured by Log or Revolutions
State of Loading, Light or Deep ? Sea find page of each passage
Was the Propeller immersed?
General Remarks as to reliance which may be placed current observations:
Currents are whenever passible worked between reliable Stellar or
Solar Observations

A.M. FORM 953

FORM FOR TESTING LOGS. Examined 27" october 1936

o. of Log haracter. ate. ature of Voyage. aptain.	For whole of Log Ext. Commencing 29 April 1936 Ending 1 August 1936 From Calicul To Duban, Daker, Hur york, Mortkest, Ballar, Lor R. C. Neville "Rescenor" Steam, Mutor as Sail	No. of Days' observations 7/ Cayeles, Manila.
hip.	"Rescend	
Sarometer.	No. 334 Height of Cistern 46 feet.	` .
Thermometers.	Sea Surface No. 31934 Dry Bulb No. 3/4/3	Wet Bulb No. 32355
Hydrometer.	No. 1274	Chambelly dated ? Ya
Entries. Character.	Are there too many entries of "Do." instead of observations?	Correctly dated ? Yes
Ship's Positions. Character.	Are observed and D.R. positions given throughout at Noon? Yes At other times when short period currents are given? Yes Do positions appear trustworthy? Yes	ns omitted ? N me .
Currents. Character.	Given in log for 24 hours? Yes Are data regularly given? Yes ", ", short intervals? Yes Are they correctly calculated? Yes Is data given for finding middle position with accuracy? Yes	Was Pt. Log used or Revs. ? Revs. Was propeller immersed?
Course and Distance.	Is true course noted each 4 hours? Yes.	
Winds. Character.	Direction: To two points or one point? One point, " Are changes carefully given? Force: Are changes carefully given?	
Barometer. Character.	Is daily range regularly shown in tropics? Have comparisons been made with shore stations? Is there evidence of repetition or interpolation? Is attached thermometer always given? Is the true atmospheric pressure correctly given?	er recorded for comparison? They on
Dry and Wet Bulbs. Character.	How is screen situated? Neather side, provide observation? Is it well placed for observation? Is diurnal range shown? Any signs of being in sun? Any signs of being affected by local heat? Is there a fair difference ranging with weather?	Obs. read to 🚅
Clouds. Character.	FORM: Well given? Yes Regularly given? Yes Sim	nple and compound well separated ?
Weather.	Is it fairly represented? Is notation correctly Is scale of fog and visibility used?	v
State of Sea. Character.	Is direction regularly given? Yes Disturbance 0 to 9? Yes Is Douglas scale use	Obs. read to $\frac{1}{2}$
Sea Temperatures. Character.	Average number of observations daily? Sex Name TESTS. Range with latitude	Obs. read to
	Average number of observations daily? One	Initials.
Specific Gravity. Character.	9. Name TESTS. Low withouris Parama Bay	
Specific Gravity.	Are any interesting facts given? No	Currents checked by Do. extracted by Remarks extracted by 285
Specific Gravity. Character.	Are any interesting facts given? No Are they full? Yes Is there duplication in Remarks of information in other columns? Yes	Do. extracted by Remarks extracted by Log coded by Log checked by
Specific Gravity. Character. Remarks. General. Character. Wireless Weather Register.	Are any interesting facts given? No Are they full? Yes Is there duplication in Remarks of information in other columns? Yes Hydrographical? None Are Schedule times correctly used? Not a Selected Ship Are messages correctly coded?	Do. extracted by Remarks extracted by 289 Log coded by CEV.

4

OCEAN CURRENT OBSERVATIONS.

SYNCHRONIZED WEATHER OBSERVATIONS OVER ALL OCEANS.

Address to which acknowledgment for this report and the Marine Observer may be sent. EAGLE OIL AND SHIPPING CO.

SAN ALBERTO. Captain C. VIDOT. Voyage—From. BEAUMONT. TEXAS. to SHELLHAVEN.

MOTO	SA. Ship. SA.N	ALBEI	To. Captain C. V.	D.O.T		oyage—FromD. A. M. B. J.	1			 1	ri:	Position			
Year 193.9	Ship's Position, Course and Speed	Wind at time of	Barometer	Temper- atures	Weather	Cloud Types and Amount	Sea	Swell	REMARKS	Year	Time		Set	Drift Nautical	REMIRES
		observation	• True Change or		At time Visi- bility	Lower Cloud Upper Total I		O-9 Director	Information relating to duration of rain, hail, &c., &c. Times of arrival and departure from Ports, occurrence of	193. 9 .	From To	The second secon	Direction True	Miles	
Month Day Day Greenwich Time of Observat'r	Latitude Longitude Course during	Direc- Force	Uncorrected Att. Atmos- Tendency	Air Sea Surface	of Past Scale	Type Amt. Cloud Cloud Clouded Type Type Tenths	tion Doug- Frue las	True Doug-	phenomena.		Day A.T.S Day A.T.S	Latitude Longitude Latitude Long	tude	1 / 1	
Month Week	Latitude Longitude Course during last 3 hours	True 0-12	Reading Ther. Pressure at Sea Level Barometer		vation	tenths	Scale	Scale	SAILED FROM BEAUMONT. TEXAS. M. 12.30. G.MT. ON. 5/2/38			N. W. N. W	Lie Killerije	1-140-1	• • • • • • • • • • • • • • • • • • • •
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SMELL SCALE. SEA SCALE. DOUGLAS SEA AND SWELL SCALES SEPARATELY.

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FOG AND VISIBILITY SCAI

ON HIS MAJESTY'S SERVICE.

19

The Director, Meteorological Office (M.O.1.), Air Ministry,

Kingsway,

LONDON, W.C.2.

OF THE WEATHER.

LETTERS TO INDICATE THE STATE

1st May, 1930. METEOROLOGICAL OFFICE, AIR MINISTRY, W.C.2.

These synchronized weather observations made at Greenwich Mean Time in all parts of the world, at time agreed to internationally, are desired to range from many other purposes.

On completion of each voyage, or at intervals of not more than two months, these forms should be folde and returned to the address hereon. Postage from ports abroad will be refunded upon request. State need not be prepaid. Postage from ports abroad will be refunded upon request. Copies of "The Marine Observer" are sent to all ships on the list regularly contributing observations o these forms, and the necessary plank forms are sent with "The Marine Observer" or Supplement monthly.

As a check on the Barometer, the test card (Blue postead) should be completed and sent in every thre months if Form 966 has not been renewed by the Port Meteorological Officer or Agent during that period.

Pull instructions as to observation and keeping these records are given in the 5rt Eduring that period.

Observer's Handbook.

Observer's Handbook.

Captains of ships in the list of regular voluntary observing ships in "The Marine Observer", who are no detailed for keeping a meteorological log, are requested to have the necessary observations made and entered of this form.

It is desired that in observing ships which have two officers in each watch, observations should be recorde at all four times each day; but when there is only one officer in a watch, the observations should be made an recorded only at the times which fall in daylight.

These synchronized weather observations made at Greenwich Mean Time in all narts of the world at time.

SHIL S WETEOROLOGICAL RECORD OF SYNCHRONIZED OBSERVATIONS

METEOROLOGICAL OFFICE, LONDON. AIR MINISTRY.

536 .2 3. H . W 28/11 000, 31 81-01/00762. W

FORM 911.

Signdfure and Rank of Principal Observing Officer.	
I. B. Harrison. (Think offices).	(If not a Selected Ship, cross out words in italics).
	particulars of communication
true record of the $$ coded messages sent by $W.T.$, together with	"Marine Observer." The observations recorded herein have been carefully made, and the Register, Form 138 attached, contains a true record of the coded messages sent by W.T., together with
eorological Officer or Merchant Navy Agent. See list in	Requirements for next voyage may, with advantage, be notified direct to the appropriate Port Meteorological Officer or Merchant Navy Agent. See list in
	YONE
When and where last compared 2MAN CHESTER. 22/ Height above Sea level	Barometer, (Mercury or Aneroid)?
	Particulars of Instruments:—(Please write word Ship in each case where not M.O.)

bednesday 21st day of May , 1946 H.M.S. " Naiad Lea. or At , To Fromthe Otho Distance Run LEAVE GRANTED TO SHIP'S COMPANY Temperatur (°F) Rew Mean Direction (true) Direction (Name and Name and Na through the the Water of REMARKS 0006 Std. Hardell bg. 225° 0014-20hks. 1020 Commenced night zigger. iso ale occ. "0145 m/e 690". 0100 856.7 20 4 270° 208 10 0 00° 4 8 00° 5 0 09° 4 8 00° 0215 of c45° to close white lights 0220 ali 070° 7 6 048° 12 8 090° 1 6 180° 7 9 4 270° 0305 a/c180° 0314 Dro Id. hore 142° 0330 a/c 270° 63 1.740 de 090° 128 ---6 4 090°

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ANNEX F

Houson.

H.M.S. Sufforh. Turs day_ From or at North Tia REMARKS AND UPPER AIR DATA; Time (Zone Lati-tude Low Middle High (‡ Including upper winds from smoke-burst and pilot balloon observations, and upper air temperatures and humidities) (1) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) 0100 Tima Rainbow at 2115. 7 0800 60° 37N 1° 42'E 280° 7 (30) 996·0 3 00 567, 49 46 53 25. 48 3 57 6/ E 3c 7 34 380. 1100 2 - 3 1/0 1/0 1500 6 1300 60 38/N 223/5 323 6(33) 9942 2 1.6 698 46 40 64 46 6 44 300 1400 afopeaing to extend from the horizon to the ship side 1500 1600 1700 2300 Midn't

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Time (Zone C.M.I.:)	Lati- tude	Longi- tude	Direc- tion (true)	†	meter Reading in Millibars (corrected)	Characterist	Amount in Milli- bars per three hours	Sea	Bulb	Wet Bulb	Dew Point	Low	Middle	High	Amount of low cloud (tenths of sky covr'd.)	Total amount of cloud (tenths of sky covr'd.)	Height of base of low	Present Weather	Away from	Towards the land	Sea and Swell (Combined Scale)	Swell, Direction
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From Gibraltar To VK or at

FORECASTS, REMARKS AND UPPER AIR DATA;

(† Including upper winds from smoke-cloud and pilot balloon observations, and upper air temperatures and humidities)

Horteast to 1900.

Andersone a complex low Not the agrows has a frontal trough excluding to N.W. Spain. a Ridge of High Pressure exclanding from Greenland to 8. England is marring aboutly S.W behind a Dinds.

Linds. E. 25 30 the Vending to back slowly.

Linds. Cloudy with occasional rain or dingle.

Cloud. 7 to 10 tenths at 1000 ft. but towaring to 500-600 ft in rain.

Visibility. 3.5 mls. but less than 2 mls at times.

See Rough. Swell E. hoderate.

Gutlook Clearing somewhat with E. winds continuing

Wilet Winds

0420 Ext.

- Surface 095 26 094 30

1000 102 31 098 32

2000 109 39 106 27.

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\$000 118 35 115 22
600 120 32 120 20
- 4000 120 24 128 15
10000 136-20 235 10

Forecast to 0700

Inverse. a very deep depression N. of the augures is almost stationary. a cold front affroading from the N.E. will probably pass during the middle watch Winds. E. 25-30 knots, queting to 25 kts. at first. Moderating slowly Weather. Mainly fair.

Would 10 tenths at 1000 ft becoming 3-6 tenths at 1500-2000 ft.

Niewlitz 2-5 ands at first, cleaning to 8-10 mils. by morning sea. Rough

Lucel E. Kather beavy. Tending to moderate

Outlook. Ess cloudy with moderate N.T. winds blooky to morning.

REMARKS AND UPPER AIR DATA;

() Including upper winds from smoke-burst and pilot balloon observations, and upper air temperatures and humidities)

A.M. Forecast. (Issued at. 0800 for 9 hours commencing 0800) Depression in Central Bay of Bengal has filled up. Weather now fine for some distance south and East of Ceylon, Forecast - Wind west to NW force 3 to 4 weather fin . Visibility Very good.

About 0800 several watersports observed near the ship depending from large cumulus clards which were present in addition to the St. Con reported appoints. Average flying wear one well developed watersport observed it from about 100 yards range and reported it as rotating anticlockwise, diameter estimated at 30 feet near the middle but about 20 gards where it met the sea. The sea was much distribed giving to impression that solid (liquid!) particles of water were being lifted into the air by the formal shaped sport. The cloud appeared to be very dense from the aircraft underneath it and the hilst reported considerable bumpiness though not such violent bumps as when flying unside a cumulus cloud itself. A heavy shower near the watersport was tasted by the pilst + found to be salt was while a similar shower some distance away applaced to be presh. These showers were not visible from the ship.

		0800	12	, ro	170	Ю
Thying Conditions	P	W	P	W		W.
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P.M. Forecast. (Issued at 700 for 15 hours commencing 1700)

Wind between north and west west weather fine Visibility very good

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 | Height of base of low cloud (feet) | (12) Present Weather | Visibility | Sea and Swell (Douglas Scale) | noitoand, Direction 54
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† When a wind speed recorder is fitted, speed in knots should be inserted in brackets after Beaufort Force, e.g. 7(30)

ANNEX I

Cigarette End

Discovered in HMS CEYLON Deck Log 16 April 1937.

